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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.		
10/080,226	02/21/2002	Thomas F. Soules	11595 GEC 2 0609	8341		
7590	03/24/2004		EXAMINER			
Timothy E. Nauman, Esq. Fay, Sharpe, Fagan, Minnich & McKee, LLP 1100 Superior Avenue, Seventh Floor Cleveland, OH 44114-2518				MACCHIAROLO, PETER J		
		ART UNIT		PAPER NUMBER		
				2875		
DATE MAILED: 03/24/2004						

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/080,226	SOULES ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Peter J Macchiarolo	2875

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 21 January 2004.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1 and 3-19 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1 and 3-19 is/are rejected.  
 7) Claim(s) 4,11,14 and 15 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. The reply filed on 01/21/2004 consists of changes to the claims, and further, the reply consists of remarks related to the prior rejection of claims in the previous Office Action. The above have been entered and considered. However, pending claims 1, and 3-19 are not allowable as explained below.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a graphical representation of the white emitting halophosphate having a correlated color temperature which is at least approximately the same as that of the lamp must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

4. Claims 4, 11, 14, and 15 are objected to because of the following informalities:  
5. The claims depend from canceled claim 2. The Examiner is interpreting the claims to depend from claim 1. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**6. Claims 1, 5, and 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by de Hair et al (USPN 4602188; “de Hair”).**

7. In regards to claims 1, 5, and 14-16, de Hair discloses in the abstract and figure 3, a mercury vapor discharge lamp comprising an envelope (1), means for providing a discharge (3, 2) a discharge-sustain fill of mercury and an inert gas sealed inside the envelope, a phosphor containing layer (4) coated inside the envelope, including a blend of a blue-green emitting halophosphate (abstract, c), a red emitting phosphor (abstract, a), a green emitting phosphor (abstract, b), and a white emitting halophosphate having a correlated color temperature which is at least approximately the same as that of the lamp (abstract, c; 2900° K vs. 2800° K). Further, de Hair discloses in the abstract that the red emitting phosphor includes a rare-earth phosphor, the phosphor blend is free of blue-emitting rare earth phosphors, and that the lamp has a CRI of 80<sup>1</sup>.

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<sup>1</sup> De Hair, col. 1, ll. 14-20.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**8. Claims 3, 11-13, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Hair.**

9. In regards to claim 3, de Hair is silent to the specific values of elements that comprise the blue-green halophosphate being activated by Sb.

10. However, the Examiner takes Official Notice that calcium halophosphate (blue halo) is known to one of ordinary skill in the art, and discovering Applicant's general formula would have been obvious, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

11. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the lamp of de Hair, including the general formula of Applicant, since blue halo is known, and discovering the optimum or workable ranges involves only routine skill in the art. The Examiner further notes that Applicant has not traversed this point and therefore agrees with the Examiner.

12. In regards to claims 11-13, de Hair discloses limitations common to claim 1 and will not be repeated here. De Hair further discloses that optimization of phosphor percent weights are

required for a specific lamp, and may include up to 45% of the white emitting halophosphate present in the phosphor blend.<sup>2</sup>

13. Although de Hair is silent to the white emitting halophosphate being about 70% by weight of the blend of phosphors, one of ordinary skill in the art would arrive at the white emitting halophosphate being about 70% by weight, since this requires only routine skill in the art. *In re Aller*, 105 USPQ 233. One would arrive at such a modification since it is known that a white-emitting halophosphate, such as the calcium halophosphate activated with antimony and manganese as recited in claim 4, is a relatively inexpensive “filler” phosphor.

14. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the lamp of de Hair with about 70% white emitting halophosphate, since this will decrease the total cost of the phosphor.

15. In regards to claims 17 and 18, de Hair discloses the claimed lamp structure above and will not be repeated here.

16. While de Hair is silent to a method of manufacturing such a device, Applicant’s steps of forming, and coating are very broad. Hence, the structure discloses by de Hair meets Applicant’s recited method step limitations.

17. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the lamp structure of de Hair, with the method of claim 18, since the method steps are obvious in light of the resultant structure.

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<sup>2</sup> De Hair, col. 9, l. 61 to col. 11, l. 18.

18. **Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Hair in view of McSweeney (USPN 5232626; "McSweeney").**

19. In regards to claim 4, de Hair is silent to the general formula of the white-emitting calcium halophosphate.

20. However, McSweeney teaches that a white-emitting calcium halophosphate has a general formula  $\text{Ca}_{9.79}(\text{PO}_4)_3\text{F}_{1.85}\text{Cl}_{0.4}\text{O}_{0.06} : \text{Mn}_{0.15}\text{Sb}_{0.12}$  which meets Applicant's limitations, and furthermore, McSweeney teaches that this composition is more durable during a manufacturing process and retains its brightness<sup>3</sup>.

21. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the lamp of de Hair, using the white-emitting phosphor of McSweeney, since this phosphor is more durable during a manufacturing process and retains its brightness.

22. **Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Hair in view of Shimizu et al (USPN 6224240; "Shimizu").**

23. In regards to claims 6 and 7, de is silent to the green phosphor, which is activated by Tb, being one of the recited phosphors. Further, de Hair is silent to the red phosphor, which includes yttrium oxide, being activated by Eu.

24. However, Shimizu discloses that a green phosphor which consists of lanthanum phosphate and activated with cerium (3+) and terbium (3+), and a red phosphor which consists of yttrium oxide activated with europium (3+) are commonly used phosphors in a fluorescent

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<sup>3</sup> McSweeney, col. 2, ll. 27-44, and col. 1, ll. 49-55.

lamp, and further that these phosphors are very efficient while ensuring proper recognition of colors at a minimum level<sup>4</sup>.

25. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the lamp of de Hair, including the phosphors of Shimizu, since these phosphors are very efficient while ensuring proper recognition of colors at a minimum level.

26. In regards to claims 8-10, de Hair discloses that the red and green emitting phosphors are both rare earth phosphors.

27. de Hair is silent to the specific ratio of the halophosphate to rare earth phosphors in the lamp.

28. However, Shimizu discloses that emission efficiency of the lamp decreases as the proportions of LAP (Shimizu's chemical formula 1) and YEO (Shimizu's chemical formula 2) with respect to the rare-earth element phosphor increase<sup>5</sup>. Although Shimizu is silent to the exact ratio, one of ordinary skill in the art would be able to obtain an optimum ratio, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

29. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the lamp of de Hair, including the recited ratios, since Shimizu teaches there exists an optimum value of LAP, YEO, and rare-earth element phosphor,

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<sup>4</sup> Shimizu, col. 10, ll. 8-18, and col. 2, ll. 57-64.

and discovering the optimum or workable ranges involves only routine skill in the art. The Examiner further notes that Applicant has not traversed this point and therefore agrees with the Examiner.

***Response to Arguments***

30. Applicant's arguments filed October 28, 2002 have been fully considered but they are not persuasive.

31. First, Applicant alleges de Hair does not suggest a lamp with the white emitting halophosphate having a correlated color temperature which is at least approximately the same as that of the lamp (p6 ¶3). However, the Examiner respectfully directs Applicant to the abstract of de Hair, "a low-pressure mercury vapor discharge lamp having...a color temperature of 2800° K or higher," and "at least one luminescent halophosphate of the group which comprises the calcium halophosphates emitting white light... having a color temperature of at least 2900° K." The Examiner asserts that correlated color temperatures of 2800° K and 2900° K are at least approximately the same.

32. Secondly, Applicant alleges "there is no suggestion in de Hair of providing a triphosphor blend such that the addition of a white halo does not affect the final color temperature" (p6 ¶4; p7 ¶4). The Examiner respectfully points out that Applicant does not claim this allegation. Instead, Applicant has claimed in claim 1 a mercury vapor discharge lamp with one phosphor layer containing four different phosphors, i.e. a blue-green emitting halophosphate, a red emitting, a green emitting, and a white emitting halophosphate, which de Hair clearly anticipates

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<sup>5</sup> Shimizu, col. 20, ll. 8-14.

in the Abstract (see above rejection). Further, the method recited in claim 17 is extremely broad, i.e. "forming...forming...and sealing" and is obvious in light of de Hair's teachings (above).

33. Thirdly, Applicant alleges, "there is no suggestion in de Hair that such a large amount [about 70%] of white halo could be used in a phosphor blend [and] typically, large amounts of white halo are undesirable" (p7 ¶1; p7 ¶8). The Examiner respectfully disagrees. De Hair clearly motivates one to use up to 45% white halo (see above), which the Examiner asserts is a large amount. Increasing the weight percent to about 70% would be obvious to one skilled in the art to reduce the overall price of the lamp (see above). Further, the Examiner points out that sometimes this large amount is desirable, as evidenced by Applicant's statement, "typically such large amounts are undesirable."

### *Conclusion*

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

35. Previously cited U.S. Patent 5612590 published March 18, 1997 to Trushell et al discloses a lamp having a blend of phosphors. This reference is evidence to support the Examiner's statement that blue halo is known in the art (see col. 4, ll. 14-17, and ll. 29-30).

36. Previously cited U.S. Patent 4800319 published January 24, 1989 to Van Kemenade et al discloses a lamp having a blend of phosphors. This reference is evidence that optimizing the white emitting halophosphate in a blend of phosphors is known in the art.

37. U.S. Patent 5838100 to Jansma is evidence that white emitting halophosphate activated with antimony and manganese is known to be inexpensive (col. 2, ll. 15-20).

38. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

39. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

40. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (571) 272-2375. The examiner can normally be reached on 8:00 - 4:30, M-F.

41. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

42. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

pjm

*Stephen Husar*  
Stephen Husar  
Primary Examiner